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### Leadership as an emergent group process: A social network study of personality and leadership

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**Leadership as an Emergent Group Process:  
A social network study of personality and leadership**

**ABSTRACT**

A longitudinal study was conducted on a leadership network to explore how Big Five personality characteristics affect receiver ties (being nominated as a leader), sender ties (nominating others as leaders), and similarity effects (nominating similar/different others as leaders). These tendencies were assessed within a group of 41 students across three time points. The findings demonstrated that personality characteristics of both leaders and followers influence the emergence of task and relationship leaders. The findings provide evidence that leadership is a dynamic group process and that integrating leader-centred, follower-centred and relational similarity effects offers a more thorough understanding of the role of personality in the social process of leadership emergence.

**Keywords:** Emergent leadership; social network analysis; Big Five; personality

Traditionally, leadership research has been leader-centred; for example, the great man theory (Bass, 1990) drove a search for enduring characteristics and traits that defined outstanding leaders across contexts (Judge, Piccolo, & Kosalka, 2009). Other research has taken a follower-centric approach by arguing that without followers, there can be no leader, and that followers play a key role in constructing and perceiving the leader (Meindl, 1995; Schyns & Felfe, 2006). A third perspective suggests that leadership depends on a match between the leader and the situation, of which the followers are an integral part (Hollander, 1978; Sy, 2010). Leadership emergence, is defined as a *social process* during which some individuals, over time and through social interaction, are recognized and accepted as leaders by the group (Hollander, 1978), where all three factors (leadership, followership, and similarities/differences between leaders and followers) individually play a role in determining who emerges as a group leader. However, the leadership field still needs to address how these perspectives collectively provide insight into leadership emergence. This paper attempts to bridge the perspective gap by simultaneously considering the roles of leaders, followers, and (dis)similarities between group members in the emergence of leadership in groups. Specifically, we analyze leadership as a group process.

The purpose of this paper is twofold. First, we aim to develop a better understanding of the effects of Big Five personality traits on the social process of

leadership emergence. While much attention has been spent on factor analysing the Big Five to distinguish them as separate personality concepts, research is only beginning to establish their predictive utility in relation to specific roles and behaviours (Cuperman & Ickes, 2009). Furthermore, although extensive research examines the role of leaders' Big Five personality traits in shaping their ascent to leadership positions (e.g. Judge, Bono, Ilies, & Gerhardt, 2002), little research demonstrates how followers' personalities, as well as the "fit" between personalities of leaders and followers, have a direct impact on the construction of emergent leadership in groups. We therefore conduct an *exploratory investigation* of the role of personality traits in shaping leader perceptions, follower perceptions, and leader-follower dis(similarity) dynamics during the social process of leadership emergence. To our knowledge, this is the first study to juxtapose leader-centered, follower-centered, and similarity approaches, which are traditionally examined independently from one another, to analyze the overall effects of personality on the process of leadership emergence. While Big Five personality traits are typically examined in relative isolation as individual level characteristics, our methodological approach embraces a more holistic view of personality and its influence on the group construction and selection of leadership.

Our second objective is to answer a call for a social network approach to leadership emergence. We propose that our network approach appropriately treats leadership as a group process, fuses all three perspectives on leadership in the same

analysis (leader, follower, similarity), and statistically tests their respective impact on leadership emergence. Our network approach is based on influential theoretical models of leadership which treat it as a network of leadership perceptions (hereafter “leadership network”), where nodes and arrows represent individuals and leadership nominations respectively (Carson, Tesluk, & Marrone, 2007; Mehra, Smith, Dixon, & Robertson, 2006). This representation simultaneously examines the mutual perceptions between leaders and followers, permits multiple leaders to emerge in a group, and accounts for the relational structure of the group as a whole. The end results provide a structural pattern of the social construction of leader emergence (Mehra et al., 2006). Treating leadership emergence as a dynamic process, we track leadership networks over time and model their evolution using current statistical models developed to analyze longitudinal network data (Snijders, van de Bunt, & Steglich, 2010). This modelling approach allows us to test the impact of Big Five personality leader, follower, and similarity effects in relation to the social process of leadership emergence. By adopting such an innovative approach, we aim to answer calls to “build a theoretical integration of current knowledge (Chemers, 2000) and to find conceptual and methodological instruments able to empirically clarify the relative weight of different [leadership] approaches at the correct level of analysis” (Kenny & Levi, 2009:148; Van Vugt, Hogan, & Kaiser, 2008).

## LEADERSHIP EMERGENCE AS A SOCIAL PROCESS

### *Emergent leaders*

Research on personality and leadership typically adopts a leader-centered perspective. The great man theory and related trait approach to leadership have assumed a set of stable, potentially universal characteristics diagnostic of effective leaders (Bass, 1990). Previous research demonstrates that traits such as extraversion (Judge et al, 2002), cognitive intelligence (Judge, Colbert, & Ilies, 2004), and self-monitoring (Ellis, 1988; Mehra, Kilduff, Bass, 2001) facilitate leadership emergence. To better explain the role of leaders' traits, implicit leadership theories (ILT) argue that people are perceived as leaders when they endorse specific traits which match perceivers' leader prototypes or exemplars. ILTs suggest that personalities will be recognised by others and categorized as being role congruent when they are consistent with schema-based expectations about who should be the leader (Shondrick & Lord, 2010). The greater the match between the leader's characteristics and the follower's leadership schema, the greater the leadership perception (Hogg & Vaughan, 2008). For example, a recent study found that female managers prefer participative, charismatic, and team oriented leadership prototypical dimensions more than male managers, consistent with gender-based leadership schema or ILTs (Paris, Howel, Dorfman, & Hanges, 2009).

The Big Five has emerged as a popular taxonomic structure for covering key stable aspects of personality. A recent meta-analysis has shown that certain Big Five personality traits are significantly related to leader emergence and effectiveness (Judge et al, 2002). Specifically, the meta-analysis found conscientiousness, extraversion and openness to be significantly positively related to leadership emergence, and neuroticism to be negatively related. Agreeableness failed to show a significant relationship (Judge et al., 2002).

In accordance with Judge et al. (2002), we expect the Big Five personality traits of leaders to be related to emergent leadership. However, we propose to extend their findings by simultaneously taking into account the role of followers' personalities in the process of leadership emergence. While the literature provides much evidence that leaders' individual differences drive leadership emergence, these qualities are typically examined in isolation. The leadership literature would benefit from a more integral approach to the understanding of who nominates emergent leaders and we therefore additionally examine the role of followers' personalities in leadership emergence.

### ***Emergent followers***

Follower-centered approaches recognize the active role of followers in the leadership process (Meindl, 1995; Schyns & Felfe, 2006). Relevant research suggests that the characteristics of followers are just as important as the leader's for sustaining

the group as a whole (Felfe & Schyns, 2010; Kaiser, Hogan, & Craig, 2008), yet little research discusses the impact of follower personality traits on the social process of leadership emergence.

Followers' individual characteristics affect how ready they are to be followers, over and above the leader's characteristics (Howell & Shamir, 2005). Just as implicit leadership theories are enacted based on implied beliefs about who constitutes a suitable leader, there can be implicit beliefs about who might constitute a suitable follower (implicit followership theories; IFTs) (Shondrick & Lord, 2010). Followers can see themselves as deferent, passive and obedient, or more questioning and challenging (Carsten, Uhl-Bien, West, Patera, & McGregor, 2010). A prototypical follower is generally one who is hard-working, enthusiastic, and cooperative, whereas an anti-prototypical follower is subversive, rejects authority, incompetent, and/or conforms too much and too easily (Sy, 2010). Follower characteristics are significant through their influences in guiding choices relating to leaders: whether they conform to them, resist them, or act as an audience (Collinson, 2006).

Related follower research provides some insights into specific personality constructs and how they relate to leader preferences. Ehrhart and Klein (2001) found that individuals' preferences for written leader descriptions (task, relationship, and charismatic leaders) were partly influenced by individual differences and values. The significant findings revolved mainly around task leadership; it being preferred by



followers higher in self-esteem, higher in desire for structure, higher in valuing security and interpersonal relations, but lower in valuing participation and intrinsic working. Those lower on security values and higher on participation values also preferred charismatic leaders. Hetland, Sandal, and Johnsen (2008) had subordinates complete the Big Five personality measures and rate their supervisor on the multi-factor leadership questionnaire (MLQ). The associations were only moderate; subordinates perceived more transformational leadership if they were low on neuroticism and high in agreeableness. Finally, more recent studies that have looked at the Big Five have found a positive effect of follower extraversion and agreeableness on perceptions of transformational leadership (Felfe & Schyns, 2010; Schyns & Felfe, 2006). Felfe and Schyns' findings (2010) suggest that extraverted and agreeable followers are more likely to perceive their formal leaders as transformational leaders. They were also more committed to their leaders (Felfe & Schyns, 2010). Follower neuroticism, on the other hand, was negatively related to the perception of transformational leadership (Felfe & Schyns, 2010; Schyns & Felfe, 2006). More precisely, followers high in neuroticism evaluated their formal leaders low on individual consideration, one of the key characteristics of transformational leaders.

Given that the personality of followers affects their susceptibility for being impressed or influenced by potential leaders in interactions, we expected the Big Five to be related to emergent followership. While Felfe and Schyns' studies (2006; 2010)

focus on follower Big Five personalities and transformational leadership, we extend this work by investigating the role of followers' personalities in the perception of *task leaders*, who provide leadership when it comes to organizing and improving activities, and *relationship leaders*, who provide leadership when it comes to reinforcing and creating satisfying social interactions among group members (Yukl, 2009). We also extend such work beyond static perceptions of hypothetical leaders by testing how leaders' and followers' Big Five traits simultaneously affect the emergence of task and relationship leaders in an undifferentiated group, contributing to a dynamic and holistic understanding of personality and leadership emergence.

### ***Leader-follower similarity***

Given the personality of leaders who are most frequently nominated in the group and the personality of followers who are most likely to nominate particular leaders, the third and final component of emergent leadership as a group process is the interplay between leaders and followers. Specifically, given a follower's self-reported personality, how similar or different is the potential leader's self-reported personality.

Most previous research has drawn on the similarity-attraction hypothesis and social identity theory (Hogg, 2001). The general arguments are that followers nominate leaders who they perceive to be similar to themselves because of enhanced likability, reduced dissonance, and the general self-esteem benefits of being able to more easily

project and confirm positive aspects of one's own self-concept (Ehrhart & Klein, 2001; Felfe & Schyns, 2010). Felfe and Schyns (2010) found that perceptions of a similar leader personality mediated the relationship between follower personality and perceptions of transformational leadership. When asked to select a leader, followers tend to select individuals who have a similar behavioral leadership style to themselves, in support of a similarity-attraction mechanism (Eagleson, Waldersee, & Simmons, 2000). However, this research is limited to one-sided self-reports of the relationship, and only one party's (leader's or follower's) perceptions of similarity. The current study contributes to existing literature by assessing actual similarity; by determining whether followers tend to nominate others who are similar to them. Big Five personality self-reports are collected independently from those sending and receiving leadership nominations and the differences between the two are used to operationalize (dis)similarity.

There is also evidence that leaders and followers will acknowledge each other based on qualitative *differences*, rather than nominating on similarity. Recent theories of leadership argue that this process includes leaders and followers claiming, signalling and granting distinct identities as they mutually adopt differentiated roles over time, drawing attention to complementary differences (DeRue & Ashford, 2010). Thus individual differences can be used to meaningfully differentiate and provide self-esteem support between group members, in the opposite direction to the social-categorical

similarities that unify them, satisfying a need for optimal distinctiveness (Brewer, 1991). Similarly, self-verification theory would suggest that group members with different leader and follower-relevant personality characteristics will seek to enact the corresponding leader-follower roles and appreciate it more if their differences are mutually acknowledged and personal aspects of their self-concepts confirmed or verified (Riley & Burke, 1995; Swann, 1987). Furthermore, leaders may be nominated precisely because they are different from the follower, and can therefore satisfy or fulfil a need for a particular quality that the follower is lacking (Ehrhart & Klein, 2001).

In sum, the leadership literature indicates that both leader-follower similarities and differences drive nominations of emergent leaders in groups, and therefore we generally expect that relative interpersonal comparisons on the Big Five personality characteristics will impact leadership nominations because of the various social needs and dynamics they satisfy.

## **METHOD**

### ***Taking a Network Approach to Examining Leadership as a Group Process***

To investigate leadership emergence as a group process, we adopt a social network perspective on leadership. We base our approach on the model of shared leadership which assumes that leadership may be shared, or distributed, across multiple leaders rather than being focused on a single leader (Gronn, 2002; Pearce, Conger, &

Locke, 2007; Mehra et al., 2006). Shared leadership envisions leadership as an inter-individual, multilevel phenomenon involving all members in a particular group. To represent shared leadership, a sociometric approach can also be adopted, based on the assumption that people's perceptions of leaders can be "mapped" onto a network (Carson et al., 2007; Mehra et al., 2006). In a network of leadership perceptions (or "leadership network"), nodes represent group members and ties represent leadership perceptions. At the dyadic level, the direction of the tie distinguishes between the follower, who sends the tie, and the leader, who receives the tie. At the group level, emergent leaders are identified as the nodes receiving the greatest number of ties. A network representation treats leadership not only as a dyadic relationship between a leader and a particular follower, but as a group process possibly encompassing several emergent leaders.

Because distributed leadership moves away from individualist, essentialist, and atomistic explanations toward a more relational, group, and contextual understanding of leadership, a methodology which treats groups as complex, interactive, and multi-person social systems should be used. Social network theory provides a suitable theoretical and analytical approach to studying this relational influence structure in groups (Borgatti & Foster, 2003; Mehra et al., 2006). Traditionally, network analysis measures properties of a network (e.g., density, centralization, and connectedness) and of nodes in the network (e.g., centrality, brokerage position). More recently, it has

become possible to go beyond these descriptive, cross-sectional techniques and search for a well-fitting, longitudinal model of observed networks (Snijders, 2009; Snijders et al., 2010). Models for longitudinal network data will allow us to statistically explore how individual characteristics of emergent leaders and followers, as well as the (dis)similarities between them, affect the evolution of leadership networks.

### ***Modelling approach: Longitudinal Analysis of Leadership Networks***

Actor-oriented models evaluate network dynamics according to the paradigm of statistical inference (Snijders, 2009; Snijders et al., 2010). Because they specify a longitudinal structural dynamic as the dependent variable, actor-oriented models simultaneously take into account three types of effects impacting how a network emerges: network, dyadic, and individual. *Network-effects* capture the tendency for the network to evolve around particular tie formations such as reciprocity, transitivity, or centrality. *Dyadic-covariates* model how leadership is socially constructed in and from a context or, more precisely, how leadership emerges from other networks of interactions (e.g. friendship or advice network ties) (Uhl-Bien, 2006). Finally, and most importantly for our exploratory analysis, *individual-covariates* include the role played by individual differences, i.e., the Big Five personality traits, in shaping the network evolution. Individual-covariates are the key parameters in our analysis as they address all three perspectives of leadership: Leader-centred: whether individuals scoring higher on a personality covariate are more likely to receive leadership nominations (referred to

as ‘receiver-effects’); Follower-centred: whether individuals scoring higher on a personality covariate are more likely to send leadership nominations (‘sender-effects’); and similarity: whether individuals tend to nominate leaders who are similar or dissimilar from themselves (‘similarity effects’).

While network-effects must be included to guarantee the proper convergence of the estimation, dyadic and individual covariates are included depending on researcher’s research questions. In the present analysis, network and dyadic effects are included as controls while individual covariates will help us explore the role of Big Five personality traits in shaping how the leadership network evolves over time.

In sum, by simultaneously capturing individual, dyadic, relational, and group effects, actor-oriented models offer a promising research strategy for examining emergent leadership as a group process.

### ***Participants***

The participants for this study were a group of 41 undergraduate students involved in a study abroad program. No restrictions or manipulations were imposed on the group’s composition. All participants accepted to take part in our study, resulting in no missing data. There were 27 (66%) female and 14 (34%) male participants with ages ranging from 20 to 22 ( $M = 20.6$  years,  $SD = 0.5$ ). The sample was homogeneous in terms of ethnic background (White North American). Only several of the participants were friends before joining the program. The program combined classroom instruction

**Comment [TSC1]:** Which ethnic background is this? I still think you need to say one sentence more about how they worked in groups; i.e. did they just work with different people each time on each project?

**Comment [USI2R1]:** Needed?

with real-world projects, and required participants to travel extensively throughout Europe and live in the same accommodation for four months. Each month, as a major part of their course work, participants were evaluated on their performance on classroom projects. Participants worked in different groups for each project (average 5 people per team).

**Comment [USI3]:** Meghan, can you confirm?

### ***Main Measures***

*Leadership Networks (Dependent Network).* We asked participants' leadership perceptions at three points in time (separated by one month time intervals). After being provided with a definition of leadership ("Leadership is the act of influencing the activities of an organized group in its efforts toward goal setting and goal achievement" - Yulk, 2009), participants were asked who they perceived as task leaders and separately as relationship leaders ("We are interested in who you perceived as two types of leaders during class this past month: 1) task leaders, who provide leadership when it comes to organization and planning and 2) relationship leaders, who provide leadership when it comes to making sure the group worked together as a team. Who did you see as a task leader for class this past month? Who did you see as a relationship leader for class this past month?"). Definitions of task and relationship leaders were based on Yulk's definition (2009). To record their answers, respondents had to place a check by the names of each person they saw as a leader on a list containing all participants' names.



Respondents were free to nominate as many leaders as they deemed appropriate. The relational information expressed in people's answers was then converted into a leadership network. For each type of leadership (task and relationship), three networks captured how leadership emerged over the period of analysis.

*Individual Covariates (Main independent variable).* Personality dimensions were measured using the Big Five Inventory (BFI) (John & Srivastava, 1999). The scale contains 44 self-descriptive items anchored at 1 (*disagree strongly*) and 5 (*agree strongly*). Summary scores were computed for each of the Big Five factors: Extraversion (individuals' level of assertiveness, sociability, and activity), Agreeableness (friendly, compassionate, and cooperative), Conscientiousness (organized, dependable, the tendency to show self-discipline and aim for achievement), Neuroticism (anxious and emotionally unstable), and Openness (intellectual and creative).

### ***Controls***

*Network Effects.* As mentioned above, network effects must be included in the analysis to guarantee the proper convergence of the estimation and to better understand around which local and global structures the leadership networks evolve. We included five network effects. The *out-degree* captures the basic tendency for people to nominate others as leaders. The *reciprocity* indicates if leadership nominations tend to be

reciprocated or not. *Transitivity* (example: if A perceives B as a leader and B perceives C as leader, then A will perceive C as a leader) represents network closure while *cycles* (example: if A perceives B as a leader and B perceives C as leader, then C will perceive A as a leader) can be regarded as the opposite of hierarchy. Finally, *popularity* captures the tendency for “popular” individuals (i.e., individual who receive more leadership nominations than others; i.e. more central actors) to attract extra incoming ties ‘because’ of their popularity (Snijders et al., 2010). In other words, the popularity parameters indicates if leadership emergence actually took place in our sample. We provide a visual representation of the different network effects in Figure 1.

[Insert Figure 1 about here]

*Dyadic Covariates.* The theory of relational leadership argues that leadership emerges from other social relationships among group members (Uhl-Bien, 2006). We therefore controlled for two types of social interactions potentially impacting the emergence of leadership networks: advice and friendship networks. The advice network was assessed at three points in time (“Who did you ask for class advice this past month?”) while the initial friendship network was assessed before the study abroad program began by asking participants who they considered friends (“Please place a check next to the people you consider your friends”).

*Individual Covariates.* We controlled for participants’ cognitive abilities because intelligence has been consistently related to leadership emergence in past research

(Judge, Colbert, & Ilies, 2004). Due to the particular nature of our sample, we used grade point average (GPA) as a proxy to assess students' cognitive abilities. General intelligence itself has been shown to significantly predict GPA in recent research (Ridgell & Lounsbury, 2004).

## RESULTS

The means, standard deviations, range, reliability measures, and correlations of Big Five personality traits are provided in Table 1.

[Insert Table 1 about here]

For each type of leadership network, a set of models was built using a step-wise approach. Model 1 includes network effects, dyadic covariates, and sender effects on all the Big Five personality traits. Receiver effects were inserted in Model 2 and, finally, similarity effects were included in Model 3. Table 2 summarizes the models developed for assessing the evolution of relationship leadership networks while Table 3 shows the results for task leadership networks. We report each parameter's coefficient and significance. Positive and significant parameters suggest that network evolution is driven by the tendency captured by the parameter.

[Insert Table 2 about here]

[Insert Table 3 about here]

*Network Effects* suggest that both leadership networks evolve around the same patterns of relationships. Significant negative parameters on *outdegree* and *reciprocity* suggest that, over time, people restrain the number of people they perceive as leaders and do not reciprocate leadership nominations. A significant positive parameter on *transitivity* and a negative parameter on *cycles* indicate a tendency towards hierarchical ordering (Snijders et al., 2010). Finally, a positively significant *centrality* parameter signifies that central actors tend to reinforce their centrality over time. Specifically, individuals who are chosen as leaders by many group members become more and more popular over time: they emerge as leaders for the group.

Our models also reveal that leadership networks are, to some extent, grounded in other social relationships. *Dyadic Covariates* had no effect on the emergence of relationship leaders: being friends with someone or going to him or her for class advice did not affect one's perception of relationship leadership. On the other hand, individuals who went to someone for class advice were significantly more likely to perceive the same person as a task leader.

*Emergent Leaders.* In the dynamic leadership networks shown in Tables 2 and 3, individuals who are more conscientious and extraverted than others were more likely to receive leadership nominations, i.e., to emerge as leaders. Our analysis also reveals that individuals who scored highly on openness were less likely to receive leadership

nominations. All three findings were consistent across both types of leadership emergence (task and relationship).

*Emergent Followers.* Sender effects shown in Tables 2 and 3 suggest that followers' personalities impact their propensity to send leadership nominations, i.e., to construct a leadership hierarchy for the group. Our models suggest the emergence of relationship leadership was significantly more affected by followers' personality than the emergence of task leadership. Results from Table 2 suggest that individuals who are more agreeable and neurotic than others tend to send less relationship-leadership nominations than others; while individuals who are more open than others are more likely to nominate others as relationship leaders. On the other hand, as shown in Table 3, individuals who are more conscientious than others were more likely to nominate task leaders.

*Leader-follower similarities/differences.* The (dis)similarity hypothesis received only limited support in our models. Results in Table 3 suggest that relationship leaders and followers tend to be similar only on openness to experience. In other words, people tend to nominate as relationship leaders people with a similar degree of openness. In terms of differences, results in Tables 2 and 3 show that leaders (both task and relationship leaders) and associated followers tend to be dissimilar on agreeableness, i.e., a leadership tie was more likely to appear if a leader and follower were different on agreeableness.

## DISCUSSION

The present study is one of the first attempts to simultaneously examine emergent group leadership from the leader, follower, and similarity perspectives, achieved by adopting a social network approach in combination with measuring the Big Five personality characteristics of the network actors. The main implication of the study is that leadership emerges in a group according to salient personality characteristics and the dynamic influences they generate in both directions as members are viewed as followers, leaders, and similar or different to others. The results provide some preliminary support for the simultaneous role of Big Five personality traits in shaping leadership, followership, and interpersonal nominations of emergent task and relationship leaders in groups.

Our longitudinal findings showed how leadership ties were sent and received over time. Firstly, the emergent leaders, who received more ties over time, were those individuals with higher self-reported conscientiousness and extraversion. This replicates past research linking the Big Five to leadership (Judge et al, 2002), and extends it by using a social network methodology to analyse peer nominations in shared leadership networks. Regarding followers sending ties, those higher on agreeableness and neuroticism sent less over time, and those high in openness to experience and conscientiousness sent more. This partly replicates past research on followership (e.g.

**Comment [US14]:** Ain't these two sentences very repetitive? Delete one?

Felfe & Schyns, 2010) and extends it by helping to more substantively identify relevant links between the specific Big Five traits and IFTs in shared leadership groups (Carsten et al, 2010; Sy, 2010). In terms of relational (dis)similarity effects, there were two significant relationships. Leader-follower nominations connected those who were more different on agreeableness, and more similar on openness to experience. These findings offer some personality and leadership-based insights into theories of similarity (social identification and similarity-attraction) and also to theories of distinctiveness or difference (theory of complementary needs, optimal distinctiveness, self-verification theory) in the context of groups' leader-follower relations. We now briefly discuss the study findings for each of the Big Five traits in turn.

### ***Big Five & Leadership Emergence***

Those high on openness to experience received less leadership ties. This can be explained by defining openness to experience as more about responding to vision and inspiration by identifying leaders rather than being a leader oneself. It has been shown that transformational leadership can help those open to experiences to commit more to an organization, because it helps with the expression of the trait (Moss, McFarland, Ngu, & Kijowska, 2007). This relates to our finding that in the relationship leader network those higher in openness to experience sent more nominations of leadership over time. Relatively little is known about openness to experience's general role in

leadership processes (Judge et al, 2002), although it has been implicated in helping groups to manage their diversity effectively (Homan, Hollenbeck, Humphrey, Van Knippenberg, Ilgen, & van Kleef, 2008). It may be that openness to experience facilitates information sharing and idea generation among group members, and then leaders are relatively more involved in implementing creative ideas. On the other hand, we found that leader nominations were more likely when the leader-follower pair were more similar on openness, suggesting a certain shared creative bond. Our findings contribute to the leadership literature by establishing that those high in openness to experience tend to follow more, lead less, and are probably attracted to the idea of multiple, open-minded leaders.

Conscientiousness was significant for both sent and received ties; it was thus important for both leadership and followership. We would argue this is unsurprising as the trait is relevant to ongoing task regulation and shared responsibility. In the task leadership network, conscientious individuals sent more ties over time, taking the role of hard-working followers. In both task and relationship leader networks, conscientious group members received more leadership nominations over time. Our findings are consistent with conscientiousness' generally stronger, more robust relationships with performance over the other Big Five traits due to the additive benefits of effort and coordination it adds over general mental ability (Hurtz & Donovan, 2000; Judge et al., 2002). Our findings speak to the ideas that hard-working followers are important for



reliable, dutiful working and conscientious leaders are important for ensuring reliable overall task execution and goal management (Gevers & Peeters, 2009).

Our findings also show that extraversion defined leaders who received more nominations, but not followers sending them. This is consistent with research showing that extraverts can distinguish themselves socially in a study group, causing others to quickly be attracted to them and led by their distinctive dominance and exciting social energy (Kristof-Brown, Barrick, & Stevens, 2005). Extraverts may seek rewards, approval, and status wherever possible, and securing nomination as a leader offers a direct way of accomplishing this social recognition (Barrick, Stewart, & Piotrowski, 2002; Campbell, Simpson, Stewart, & Manning, 2003).

Agreeable group members nominated significantly fewer leaders over time. This extends and refines previous research on agreeableness and followership (e.g. Hetland et al, 2008), in showing that agreeable followers may actually be quite passive, not actively identifying as many leaders in a group. Furthermore, our findings suggest that leadership nominations were associated with leader-follower agreeableness differences rather than similarities. Agreeableness in groups can lead to overly-lax norms of carelessness and missed deadlines (Bettenhausen & Murnighan, 1991). Our findings suggest agreeableness plays little or no significant role in leadership or followership except that when there are nominations, differences abound. Future research is needed to identify how much this is due to pleasant easygoing interaction motives versus a

more apathetic, socially desirable response towards emergent leadership, or elements of both (Graziano & Tobin, 2002). From an evolutionary perspective, agreeable group members may prefer to court other group members at a more interpersonal friendship level, and be relatively happy to let different would-be leaders take the risk of defining the group instead (Van Vugt, 2008). Future research might investigate trade-offs to agreeableness, for example whether it interferes with leadership and task performance or whether it helps to protect satisfaction and well-being in a group.

The only significant finding for neurotic individuals was that they sent less leadership ties over time for relationship leaders. Research on implicit leadership theories suggests that neurotic individuals may harbour irrational ideas about leaders (e.g. ‘they can rescue me’) or seek compensation from anxiety (Keller, 1999). It is possible that neurotic individuals find it hard to decide on personable leaders, or instead fixate on one particular leader figure. This is consistent with previous findings, confirming that neuroticism generally interferes with healthy leader-member interaction, via worrying about unpleasantness in relationships and emotional interference (Spangler, House, & Palrecha, 2004).

### ***Contributions***

Overall examination of the Big 5 side of our study largely supports the distinction between group personality compositions that are labelled *elevation* or

*diversity* according to whether average levels are important or more complementary differences (Neuman, Wagner, & Christiansen, 1999). Our study demonstrates that openness and conscientiousness are of general social importance for *elevating* groups via similarity and shared roles, whereas neuroticism and extraversion seem to more sharply demonstrate positive or negative implications for specific group members and their distinctiveness or *diversity* (Neuman, Wagner, & Christiansen, 1999). However, the relative lack of findings with agreeableness did appear to indicate some passivity and acceptance, rather than it being an averagely desirable elevation trait like openness and conscientiousness.

On the leadership side, our findings add some further support and refinement to the socio-analytic theory of emergent leadership (Hogan, 1983). This theory would stipulate that traits link to emergent leadership via corresponding motivations – high extraverts, low neurotics, and highly conscientious group members try to get ahead, agreeable group members try to go along or get by, and highly open individuals try to provide meaning for each other (Judge et al., 2009). Our differential findings for each of the Big 5 indirectly point to the satisfaction of different leader, follower, and relationship motivations that are broadly consistent with this theory of social motivations.

Our findings on the Big Five also contribute to social identity theory (Hogg, 2001), ILTs/IFTs, and theories of similarity/difference in defining emergent leadership

**Comment [TSC5]:** I thought I'd leave this in and try and clarify a bit. I think it's okay to have some additional material in discussion, there's not much to lose and our findings are very close with it. If you still think it very irrelevant, feel free to delete before submission though!

qualities and their dynamics. Certainly openness to experience and conscientiousness predominate as relatively healthy components likely to be prominent in group members' implicit leadership and followership theories. These two traits are most likely to be salient, attractive, and prototypical characteristics emphasised in the normative content of an effective working group's social identity and leadership process (Haslam et al, 2001). Neuroticism, agreeableness, and extraversion may be less defining of a productive group and leadership processes because of the distinctive needs of individuals that are served in their idiosyncratic expression. In this sense, a major contribution of our study is to use social networks and the Big Five traits to offer a point of integration between leader-centred, follower-centred, and relational approaches, where most previous work has focused on one at the expense of the others.

### ***Limitations***

The current study itself is not without limitations. Despite gathering rich longitudinal social network data, we relied on a relatively small student sample. To determine how far our findings generalize to other types of group and larger populations requires further replications, although where reasonable comparisons could be made, our findings were generally consistent with much previous research. Our study was relatively exploratory given the lack of previous systematic work linking specific Big Five traits to emergent leadership, followership, and leader-follower relations. There

were also many other characteristics, traits, and values we could have chosen to include or focus on in examining leader-follower differences, although we tried to select from the most influential typologies and meaningful concepts in personality and leadership. In general, we hope our work provides a thorough, clear foundation for ongoing development of our findings to identify characteristics, motivations, and behaviours driving emergent leadership in groups.

### ***Future Research & Conclusion***

Future group research should consider a similar network approach to probe and extend our understanding of specific personality trait congruence, synergies, and clashes using network or dyadic methods. Indeed, leader-follower schemas and expanded views of these roles in groups encompasses a wide range of passive, active, and proactive behaviours yet to be fully investigated (Carsten et al, 2010). While previous research has focused on exchange and the supportive quality of relationships, many other interpersonal dynamics are possible in groups with emergent leaders which remain relatively poorly understood (e.g. social dominance, expertise, seniority, formality; Oosterhof, van der Vegt, van de Vliert, Sanders, & Kiers, 2009). Future research can incorporate corresponding tests of other individual differences, including empathy, narcissism, perspective taking, reciprocity norms (e.g. Brunell, Gentry, Campbell, Hoffman, Kuhnert, & DeMarree, 2008; Kamdar, McAllister, & Turban, 2006), as well

as leadership styles, and the various social constructions around leadership as a group process (DeRue & Ashford, 2010). Another important issue is to establish how personality relates to leader and follower behaviours via motivational variables as mechanisms (Barrick et al, 2002). Specifically, emergent leadership captures the expression or resolution of multiple individual-group tensions based around what individuals want to achieve for themselves or others, the outcomes they want to approach or avoid, and their epistemic desires to manage and understand the truth or reality of a situation (Sorrentino, 1973; Kark & Van Dijk, 2007; van Kleef, Homan, Beersma, van Knippenberg, van Knippenberg, & Damen, 2009). Finally, future research should also sample different group types where leadership, followership, and leader-follower characteristics may be different and operate differently (e.g. management groups, culturally diverse groups, friendship groups).

In conclusion, emergent leadership is not simply about a ‘great person’ on the horizon, but the interplay of ‘great’ leaders, ‘great’ followers, and multiple ‘great’ social relationships between key characteristics of the two – a network of ‘great’ group process.

## REFERENCES

**Comment [TSC6]:** Sometimes I do lapse into US spelling! It may be worth making a quick check on behav- throughout the document before submission, just to make sure spelling is consistent. Likewise, whether we use S or Z for words like generali(z/s)e...

**Comment [USI7R6]:** I re-checked using UK spelling (Journal is British and guess editors are British....)

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## Appendix

*Figure 1 –Network effect*

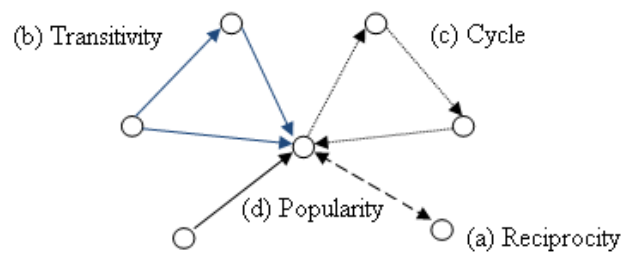




Table 1 – Means, standard deviations, and correlations between the variables of interest

		Mean	SD	Range	Cronbach Alpha	1	2	3	4
1	Agreeable	37.9	4.4	27-45	.76				
2	Conscientious	32.5	4.4	24-40	.78	.376			
3	Extravert	29.1	7	14-40	.93	-.012	-.161		
4	Open	38.6	5.1	27-49	.76	-.132	.039	.019	
5	Neurotic	19.1	5.5	9-38	.83	-.529	-.021	-.165	.154

Note:  $p < .10$

Table 2 – Evolution of Relationship Leadership Network

	Model 1		Model 2		Model 3	
	coeff.		coeff.		coeff.	
<b>Network Effects</b>						
Out-degree	-2.101	**	-1.908	**	-1.889	**
Reciprocity	0.264		0.344		0.299	
Transitivity	0.287	**	0.298	**	0.313	**
Cycles	-0.154		-0.091		-0.093	
Popularity	0.239	**	0.198	*	0.198	*
<b>Dyadic Covariates</b>						
Advice Class	0.234		0.216		0.179	
Friends Time 0	0.086		0.070		0.089	
<b>Individual Covariates</b>						
<b>Sender Effects (Followers)</b>						
GPA	-0.105		-0.060		-0.112	
Agreeable	-0.035	**	-0.034	*	-0.035	**
Conscientious	0.012		0.004		0.008	
Extravert	-0.013		-0.013		-0.012	
Open	0.023	*	0.027	**	0.022	*
Neurotic	-0.023	*	-0.026	*	-0.023	*
<b>Individual Covariates</b>						
<b>Receiver Effects (Leaders)</b>						
GPA			-0.014		-0.001	
Agreeable			0.027		0.023	
Conscientious			0.023	*	0.024	*
Extravert			0.021	**	0.018	**
Open			-0.020	*	-0.021	*
Neurotic			0.022		0.015	
<b>Individual Covariates</b>						
<b>Similarity Effects</b>						
GPA					-0.266	
Agreeable					-0.553	*
Conscientious					0.099	

Extravert	-0.310	
Open	0.489	*
Neurotic	0.268	

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\*\* p<0.01, \* p<0.05

Note: Models were re-run adding sender, receiver, and similarity effects on “Gender”. As none of the parameters on gender were significant, we concluded that, in this group, gender did not affect leadership emergence.

Table 3 – Evolution of Task Leadership Network

	Model 1		Model 2		Model 3	
	coeff.		coeff.		coeff.	
Network Effects						
Outdegree	-1.893	**	-1.886	**	-1.896	**
Reciprocity	0.027		0.016		0.001	
Transitivity	0.181	**	0.177	**	0.174	**
Cycles	-0.208	*	-0.209	**	-0.209	*
Popularity	0.068	**	0.059	**	0.061	**
Dyadic Covariates						
Advice Class	0.313	**	0.240	*	0.227	*
Friends Time 0	0.068		0.090		0.115	
Individual Covariates						
Sender Effects (Followers)						
GPA	-0.028		-0.022		-0.011	
Agreeable	-0.027	*	-0.022		-0.016	
Conscientious	0.028	**	0.022	*	0.028	*
Extravert	0.002		0.004		0.004	
Open	-0.002		-0.005		-0.007	
Neurotic	-0.010		-0.010		-0.012	
Individual Covariates						
Receiver Effects (Leaders)						
GPA			0.150	*	0.152	*
Agreeable			-0.003		-0.003	
Conscientious			0.034	**	0.033	**
Extravert			0.019	**	0.019	**
Open			-0.021	*	-0.025	**
Neurotic			0.000		-0.003	
Individual Covariates						
Similarity Effects						
GPA					-0.270	
Agreeable					-0.579	*

Conscientious	0.218
Extravert	-0.166
Open	0.301
Neurotic	0.220

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\*\* p<0.01, \* p<0.05